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The Problem of Weeds in the West

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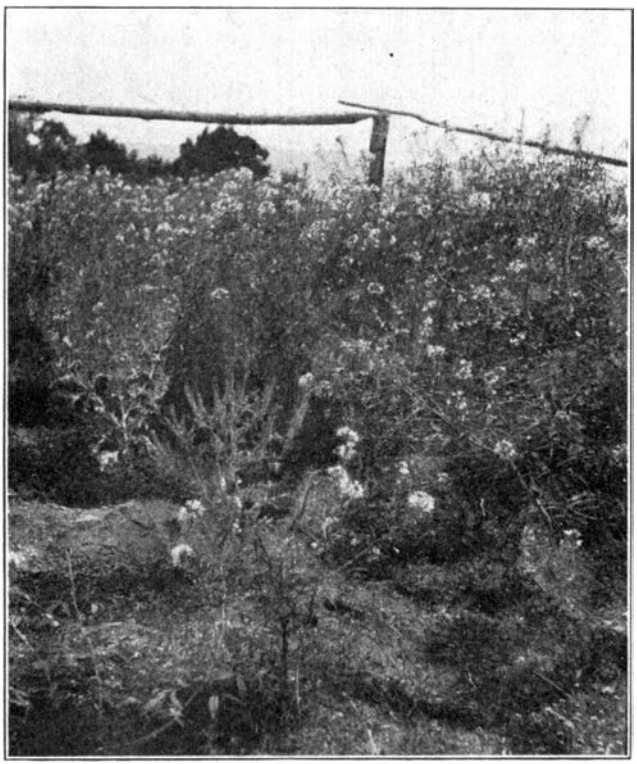
THE PROBLEM OF WEEDS IN THE WEST.

BY L. H. PAMMEL.

Weediness is an indication of poor farming. It has been said by some one that the farmers of the east do not fear the Canadian Thistle or other agressive weeds because the better methods of tillage make the fields clean.

The average yield of corn in Iowa according to the latest statistics is 32.9 bushels per acre. This can by proper methods of cultivation be more than doubled. According to the Year Book of the United States Department of Agriculture for 1903, the yield of corn per acre in Iowa from 1894-1903 was as follows: 1894, 15.0; 1895, 35.1; 1896, 39.0; 1897, 29; 1898, 35; 1899, 31; 1900, 38; 1901, 25; 1902, 32.0; 1903, 28. During this period most of the years the state of Maine had a greater yield per acre than Iowa. Iowa is in the corn belt and has a greater acreage than any other state in the Union. A part of the low yield is due to unfavorable seasons as in 1894. We have not, however, had a year since then which was in any way unfavorable for a good or fair crop of corn. The unfavorable crop returns then must be due to other causes, chief among these are the weedy fields. In the year 1908 the writer had estimates made of the yield of some typical corn fields in Iowa. It was found that good clean fields yielded 50 to 60 bushels per acre while the weedy fields only between 25 and 30. An increase of 20,000,000 bushels in Iowa should be possible by better methods of cultivation. This would mean that the farmers could easily increase their wealth by $8,000,000, allowing a little extra expense for labor.

The present day farming in the corn belt is an economic waste. Most of the weeds are easily destroyed, like the Pigeon Grass (*Setaria glauca*), Foxtail (*Setaria viridis*), Smartweed (*Polygonum pennsylvanicum* and other species), the Cocklebur (*Xanthium canadense*), Ragweed (*Ambrosia trifida*) and *A. artemisaefolia*, etc. Nearly all of our troublesome weeds are those common to the east and in Europe. Such perennial weeds as Quack Grass (*Agropyron repens*) and the Canadian Thistle, Horse Nettle (*Solanum carolinense*) are local. To the north as in Minnesota and Wisconsin such perennial weeds as the Quack Grass and Ca-



Perennial Ragweed (*Ambrosia psilostachya*), Cleome, Sweet Clover, Lepachys and other weeds of the streets of Fort Collins, Colorado.

nadian Thistle are more common. Different crops and different regions produce weeds which may become locally prominent. In southern Iowa the Horse Nettle and Cocklebur are more abundant than in Northern Iowa. In western Iowa the Marsh Elder (*Iva xanthiifolia*) is an immigrant from the west, and it has extended northward into Canada. In the Red River Valley of the North, the *Iva xanthiifolia* known locally as the half-breed weed is abundant. One sees, however, little of such common Iowa weeds as the Mayweed (*Anthemis Cotula*) and Butterprint or Indian Mallow (*Abutilon Theophrasti*). Nor is the large Ragweed (*Ambrosia trifida*) as common as in Iowa. The Woolly Thistle (*Cirsium canescens*) is abundant.

As we cross the boundary line or approach it, we see that one of the native shrubs of that country (*Eleagnus argentea*) spreads rapidly where the surface of the soil has been removed, very much as the cottonwood does in Iowa or in other parts of northern United States.

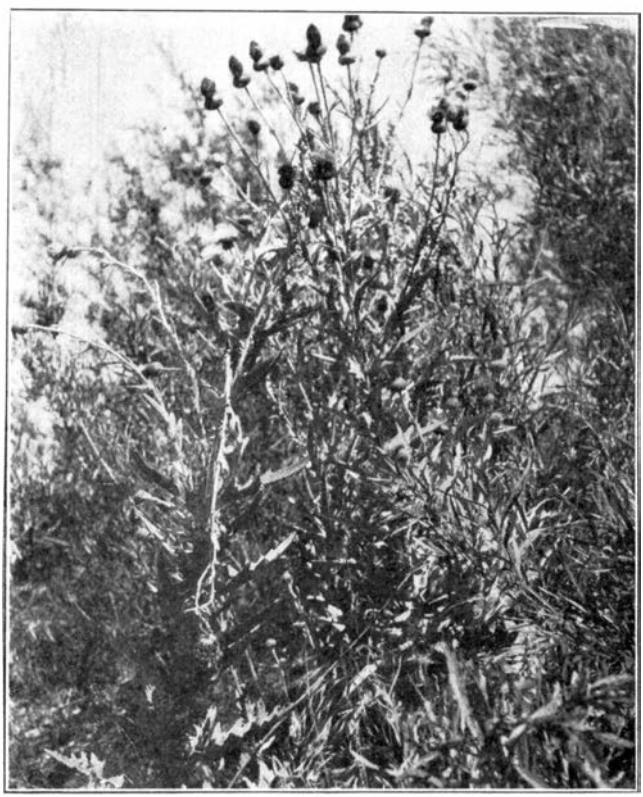
In the country from Winnipeg to Vancouver and the Rocky Mountain states, the common Squirreltail Grass (*Hordeum jubatum*) is one of the most striking weeds in fields and waste places. It is, of course, a striking weed also in Iowa, but it was rare here prior to 1876. Cultivation and neglect of tillage has caused these weeds to become extensively scattered. Weeds adapt themselves to conditions most suited for their environment and it strikes one as peculiar that the most common ruderale plants of Iowa, like the Green Foxtail and Pigeon Grass, as well as the Crab Grasses are as yet of little importance in the Canadian Northwest although troublesome in the Mississippi valley. They occur across the continent and on the Pacific coast but do not cover the ground as they do here. To the south in Montana, Idaho, and especially Colorado and Utah, they have become common. The Wild Oats (*Avena fatua*) is common in the northwest as it is in parts of Minnesota and the irrigated districts of the Rocky Mountains, largely because the weed is spread with the culture of oats. The Holy Grass (*Hierochloe borealis*) a well known native grass of the north is comparatively rare in Iowa, except northward and it is not known to be weedy in that section of the state. However, in the Canadian northwest it is a persistent and troublesome perennial weed. Other somewhat weedy grasses are Awnless Brome Grass (*Bromus inermis*), Commmon Cheat (*Bromus secalinus*) and the Darnel (*Lolium temulentum*). Today it is difficult to find common Cheat in many parts of Iowa largely because we no longer grow wheat but the Soft Chess (*Bromus mollis*) is coming in rapidly. In Utah the *Bromus tectorum* and *Hordeum murinum* have become most troublesome

weeds and rapidly spreading to Colorado. With us the *H. pusillum* is making its way northward into Central Iowa.

The next great family of interest is the Composite Family; the plants are plastic and aggressive, the old world species more so than those of the new world. In Iowa most of our composite weeds are from the old world but in the Canadian Northwest and in the West there are many indigenous native species. The Gum-wood, (*Grindelia squarrosa*) although I have known it for some years in Central Iowa, is not spreading. This weed is common from Winnipeg westward through the Rocky Mountains south to Minnesota and Western Iowa. However, it is not persistent in cultivated fields. The most aggressive of the native weeds is Marsh Elder, (*Iva xanthiifolia*) though extending eastward to the Mississippi River it is not important in the Eastern states, it partially takes the place of the Large Ragweed in the Missouri Valley, the Red River of the North and in Manitoba. This weed illustrates how a plant common in the alluvial flood plains soon adapts itself to cultivated areas. The older settlers of Manitoba always found it near buildings occupied by half-breeds but presumably also by other untidy farmers, and hence have given it the name of "half-breed weed."

The Yarrow, an indigenous plant. is abundant throughout the region from Winnipeg to Seattle, although rarely troublesome in fields. The Greater Ragweed, (*Ambrosia trifida*) one of the most conspicuous weeds in the Northern Mississippi Valley, is fairly common in the southern part of Manitoba to Winnipeg, St. Vincent, Minnesota, and Pembina, North Dakota. Outside of the Province of Manitoba it is a rare weed. The Hog-weed or Bitter-weed (*A. artemisiaefolia*) is still rarer, but the perennial *A. psilostachya* is not infrequent in Minnesota and in gravelly knolls of Iowa, and is a fairly common native plant on the plains about Winnipeg, westward it is not common, though common in the United States east of the Rockies. The common Mayweed (*Anthemis Cotula*) and Burdock (*Arctium major*) of Iowa, Wisconsin and Minnesota, are comparatively rare in the Northwest territory but more frequent on the west slope of the Rockies in British Columbia, Washington, Oregon and Utah. This is particularly true of the Burdock. The indigenous biennial Wormwood (*Artemisia biennis*) is quite as common in Manitoba as in Minnesota, while the European Wormwood (*Artemisia vulgaris*) is a common plant along roadsides in Manitoba. The European Mugwort, (*Senecio vulgaris*) seldom seen in the Northern Mississippi Valley states, is common in places in Manitoba, on the Pacific Coast, Vancouver Island and Seattle in Washington. In the recent edition of Gray's Manual Robinson and Fernald note that

Ragweed or Kinghead (*Ambrosia trifida*) common roadside weed. Texas to Canada, especially common from Iowa to North Dakota.



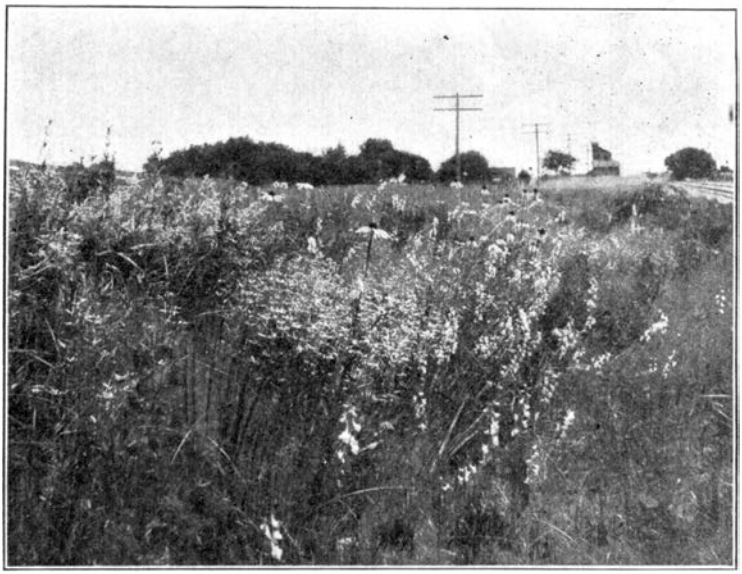
Cirsium canescens, common from western Iowa to the Rockies, north to Alberta.

it is common in waste places in the east. The common Bootjack found everywhere in Wisconsin, Iowa, Minnesota, eastern Nebraska and Missouri, in fields and along roadsides, is less abundant in Manitoba. It is rare westward in Canada and only local in the Rocky Mountains. The Bachelor's Button (*Centaurea cyanus*) is not uncommon on the Pacific Coast, especially in California. In the Mississippi Valley it is rare except as an escape from gardens, although Dr. Robinson states that it occurs along roadsides. The yellow-flowered Knapweed or Barnaby's Weed (*C. solstitialis*) has been reported from several different points in Iowa, but abundant on the Pacific Coast, largely introduced here with alfalfa seed from the west. Several other species have been naturalized on the Pacific Coast. The Ox-eye Daisy (*Chrysanthemum Leucanthemum*) was found along the railway near Sicamous Junction, B. C., and near Seattle, Wash. The roadside looked like an eastern roadside. In the East Ox-eye Daisy is recognized as one of the most common and troublesome weeds in pastures and meadows. In Iowa it rarely causes any trouble, for 15 years a small patch has been found along the right of way of the C. & N. W. Railway in Story county, but it has not, however, made much advancement to neighboring fields. Here and there in Wisconsin and Minnesota there are isolated patches but with little tendency to spread. We are told by Dr. Fernald of Harvard University that it is confined to a small area in eastern Canada and that our common plant is something entirely different.

Chicory (*Cichorium Intybus*) was not observed east of the Rockies in Canado but abundant west in British Columbia and Washington. It is abundant locally in Wisconsin and Minnesota and has become widely scattered in Iowa with clover and alfalfa seed in recent years, but nowhere abundant. The Thistles are not numerous in species but abundant. The Canadian Thistle (*Cirsium arvense*) has made its way across the continent from Winnipeg west to Vancouver Island and Seattle. It has become naturalized at numerous points, Winnipeg, Winnipeg Beach, Emerson, Moose Jaw, Calgary, Portal, North Bend, (B. C.) Bremerton, Everett, Seattle, Washington. It has spread extensively in Manitoba, occurring in fields, meadows, along roadsides and even occurring in woods. It is not unlikely that it will be as common in the other provinces of Northwestern Canada as it now is in Manitoba. It seeds freely in Manitoba. The climatic conditions seem to be much more favorable in Canada than Iowa. It has occurred for a much longer time in Iowa than in Manitoba, but it is not a dominant weed as in the Canadian Province. The plant occurs in many counties, if not in every one. Perhaps in many of the Minnesota and Wisconsin counties. It is more

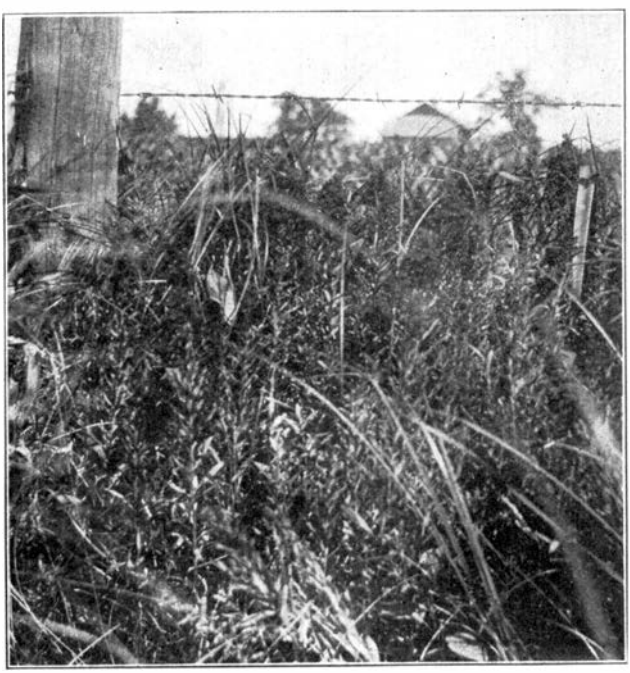
abundant in Northern Iowa than in the southern part of the state. For many years the plant rarely produced seed in this state, though the seed was not infrequently produced on plants found along the shores of Lake Michigan in Wisconsin. It now seems to have developed the seed habit in Iowa, though by no means as frequent as in Canada and in Europe. The Woolly Thistle (*Cirsium canescens*) indigenous to the country and to the south to western Iowa to the Rocky Mountains in Colorado and Montana, is common east of Calgary. The Field Thistle, (*Cirsium discolor*) though a common weed in Iowa and Minnesota, is less common in the Red River Valley and only reaches across the border into Manitoba. The Bull Thistle (*Cirsium lanceolatum*) is not common at any point east of Calgary to Winnipeg but on the west slope of the Rockies in the valleys of the Selkirks and Cascades to Vancouver, Victoria, (B. C.) Seattle, Everett and Seattle it is a common weed. It is common also in the Great Basin Country of Utah and in Montana and Idaho. The White Weeds, (*Erigeron ramosus* and *E. strigosus*) so common everywhere in the Mississippi Valley from Missouri north to Minnesota and west to Nebraska, are not to be counted among the conspicuous weeds of that country. The Horseweed, which is sometimes called the Marestail, is not abundant in the great wheat belt of Canada, although in British Columbia it is abundant in clearings and cultivated fields. The White Weeds give an interesting aspect to the meadows in Iowa in June.

The common weedy Sunflower *H. petiolaris* and the *H. annuus* are less frequently found on the Pacific Coast, but common in Kansas and Nebraska westward to the Rockies. On the prairies about Winnipeg west to Moose Jaw and Medicine Hat the *H. maximilianii* is abundant. This species also occurs in Northwestern Iowa through Minnesota to Manitoba. The Blue Lettuce (*Lactuca pulchella*) is abundant about Winnipeg and southward but not abundant in Saskatchewan and Alberta, common from western Iowa and westward. Prickly Lettuce (*Lactuca Scariola*) is common from Kamloops to Victoria and Seattle, and on the Pacific Coast in California and eastward. In some places more common than the variety *integra* which is the common form in the Mississippi Valley. The species is rare in Iowa, although the variety is abundant. The rapid spread of the variety in Northern United States since 1877 shows how remarkably well it has adapted itself to the more humid and drier regions of the country. The Pine-apple Weed (*Matricaria suaveolens*) is common from Sicamous Junction, Revelstoke, B. C., to Victoria, Vancouver, B. C., and Seattle. This weed is common on the Pacific slope, throughout the interior of the continent in



WEEDS OF THE PRAIRIE. IOWA.

Morning Glory (*Convolvulus sepium*).
Larkspur (*Delphinium carolianum*).
Goldenrod (*Solidago canadensis*).



Goldenrod (*Solidago canadensis*), Aster, and other weeds during the month of September. Iowa.

Utah and Idaho and according to Robinson and Fernald is locally abundant in New Brunswick, New England, New York and Pennsylvania and about St. Louis. Here we have a most aggressive Pacific slope weed which has adapted itself to a wide scope of territory. It is one of the few Pacific slope weeds which has thus extended its territory eastward.

The Goldenrods are poorly represented in Northwestern Canada. The Missouri Goldenrod (*Solidago missouriensis*) is common in Southern Manitoba to Winnipeg Beach and westward, but scarcely weedy. The *S. rigida* occurs in Manitoba but not a common plant. A very common weed in Iowa pastures. The Canadian Goldenrod (*S. canadensis*) is common in Illinois, Wisconsin, Missouri, Nebraska and Minnesota, often weedy in pastures and along roadsides but seldom so in Manitoba. It occurs, too, on the west slope of the Cascades near North Bend and elsewhere. The Sow Thistle (*S. oleraceus*) occurs in Winnipeg, more frequent on the Pacific Coast, Seattle and elsewhere, on the other hand, the perennial Sow Thistle (*S. arvensis*) is abundant everywhere in Manitoba from Emerson to Winnipeg and westward through the older settled portion of Manitoba. Some fields and pastures are yellow with its flowers. It is spreading about St. Vincent, Minnesota, and Pembina, and other parts of North Dakota. It is rare in other Northern Mississippi Valley states. It is one of the greatests pests of the Canadian wheat field. A field covered with it is not productive unless the summer fallow method is pursued, and this is an expensive operation and not economic where the one crop method is followed.

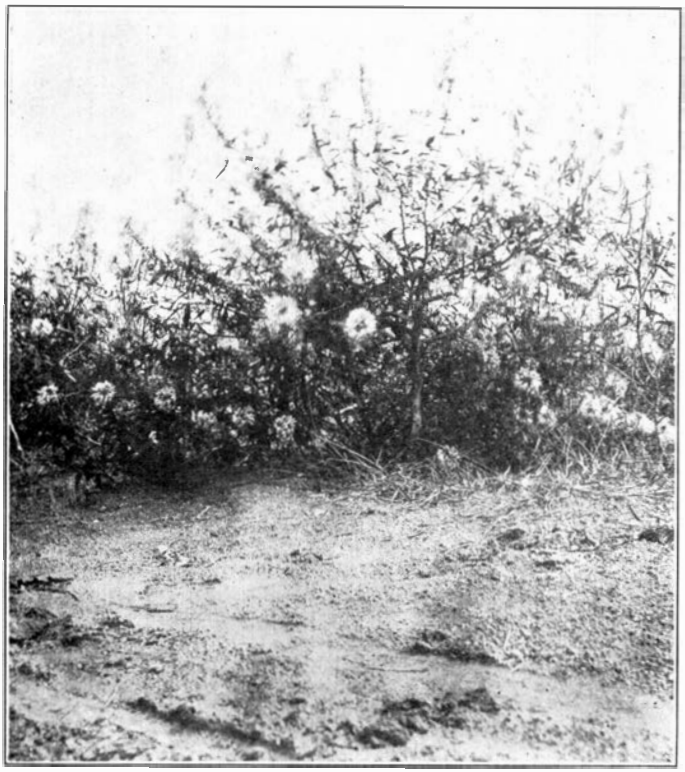
The Dandelion (*Taraxacum officinale*) is common everywhere from Winnipeg to the coast, south to Seattle. The Cocklebur (*Xanthium canadense*) from Minnesota to Texas and even in cultivated fields of the Colorado Rockies, so common to the south can scarcely be regarded as a very troublesome weed in Canada, although found about Winnipeg and Winnipeg Beach, and west to Moose Jaw. A most troublesome weed in the corn belt region.

The Cat's-ear (*Hypochaeris radicata*) which is naturalized from Europe and a ballast weed along the Northern Atlantic Coast, does not occur in the Northern Mississippi Valley; it is one of the most common weeds in lawns and in waste places from Oregon to Vancouver and the Vancouver Island. There is a common impression in Oregon that this weed was introduced in that state from Chili. A related species *H. glabra* is naturalized in California and occurs sparingly in Maine. The Hawkbit (*Leontodon autumnalis*) is common in the eastern states and in Ontario but has not found its way to the Northern Mississippi Valley. The Goat's Beard (*Tragopogon pratensis*) is a common plant in the

Rocky Mountains and along irrigation ditches and in fields in the eastern states. It rarely occurs in Iowa. The *T. porrifolius* also occurs in the Rocky Mountains. The Galinsoga (*Galinsoga parviflora*) of tropical America was first observed by the writer in Missouri near hotbeds and greenhouses in 1886. It had made its way northward to Wisconsin in 1903, and was observed in Iowa about the same time. It has spread to Utah and adjacent regions. Generally found near hot beds and greenhouses.

A few weeds of the *Cruciferae* are widely distributed in the older cultivated portions of the Northwest, especially in Manitoba. The common Mustard (*Brassica arvensis*) is one of the most common weeds of grain fields and associated with it, but somewhat more widely scattered, the Penny-cress or Stink Weed (*Thlaspi arvense*) should be mentioned. This weed is common throughout the provinces of Saskatchewan, Alberta, and Manitoba, less frequent in British Columbia. It occurs along railways and it is abundant also in the grain fields of the Dakotas and Minnesota but less frequent in Iowa. Not infrequent in Utah to Montana and Washington. Its spread in Canada is attributed to seed and hay. The Black Mustard (*Brassica nigra*) is less frequent than Charlock. It is common in Iowa. The *Brassica campestris* is more frequent on the coast in Vancouver, Washington and Oregon. The Shepherd's Pudse (*Capsella Bursa-pastoris*) is common from Winnipeg to the coast, south to Texas, the Rocky Mountain region and to the Atlantic coast. It is more abundant in the north than in Iowa because of the cooler climate.

The Small Pepper Grass (*Lepidium apetalum*) is common from Winnipeg to the mountains, though more frequent in Manitoba than westward. It, however, has spread westward through British Columbia south to Washington. It is a common weed throughout the Mississippi Valley from Missouri to Kansas to the Dakotas east to Wisconsin. Dr. Robinson says "perhaps native in the west, recently introduced eastward." It is certainly the common species in the west; the larger Pepper Grass (*L. virginicum*) is common southward, rare northward and not observed in Canada. Of the Hedge Mustard (*Sisymbrium*) the latest of the European immigrants, the Tumbling Mustard (*Sisymbrium altissimum*) which has had but a comparatively short history in this country, is frequent in many parts of Minnesota, North Dakota through Montana to Washington and to the south in Utah, and parts of Colorado and occasionally in Iowa. It is abundant in the provinces of Manitoba, Saskatchewan, Alberta, and British Columbia, occurring everywhere along railroads and in grain fields. The *Berteroa incana* is a recent introduc-



Cleome (*Cleome serrulata*) common from western Iowa introduced eastward to the Pacific, Alberta, and Saskatchewan.

tion with clover seed. The Hare's Ear Mustard (*Conringia orientalis*) of grain fields is a recent introduction. The Horseradish (*Radicula Armoracia*), Marsh Cress (*Radicula palustris*) and Winter Cress (*Barbarca vulgaris*) have long been known as troublesome weeds of the north. The Common Hedge Mustard (*S. officinale*) is not common in the province east of the Rockies though common in Iowa, Wisconsin and Minnesota. It is much more common on the Pacific coast from Seattle to Victoria, Vancouver east to Sicamous Junction and Revelstoke. Several native species occur in eastern provinces, like *S. cummunis* and *S. incisum*, the latter a mountain species. These along with the False Flax (*Camelina sativa*) make up the more important weeds of this family. The *Camelina* occasionally occurs in Iowa and is frequently found in Minnesota. Of the family *Capparidaceae*, only one species occurs in the Canadian region, namely *Cleome integrifolia*. Introduced near St. Paul and other parts of eastern Minnesota and occasionally in Central Iowa. Indigenous to Western Iowa and abundant in Nebraska westward through Colorado, Utah and Nevada and north to eastern Washington and east to the Dakotas. It is fairly common in Saskatchewan and Alberta, less frequent in Manitoba. It is rare in British Columbia except the more arid portions about Kamloops and Ashcroft.

The only common weed of the *Convolvulaceae* in Manitoba is the Morning Glory (*Convolvulus sepium*) extending west to Moose Jaw. It is most frequent about Emerson, Manitoba, Pembina, North Dakota, and St. Vincent along the Red River; frequent in Minnesota, Wisconsin, Iowa, Illinois, Nebraska, Kansas and Missouri and eastward. The European Bindweed (*Convolvulus arvensis*) of Europe long known as a troublesome weed in the east and on the pacific Coast, widely scattered as an ornamental plant and has become a troublesome weed in Missouri and here and there in Iowa, does not occur in Manitoba or westward to the Rockies, but again on the Pacific coast from Vancouver to Oregon. In the south a number of species of Morning Glory are troublesome like the common Morning Glory (*Ipomoea purpurea*) and the white and purple or pale blue flowered annual Morning Glory (*I. hederacea*) common in corn fields and springing up abundantly after the grain is cut. The perennial Man-of-the-Earth (*I. pandurata*) with fiddle-shaped leaves and white flowers is occasionally troublesome in corn fields. Mention should be made of the Dodders (*Cuscuta*). The Flax Dodder (*C. Epilinum*) in the northwest, the Field Dodder (*C. arvensis*) on clover in Iowa, Wisconsin and eastward, and the Clover Dodder in the alfalfa growing sections of the west. The common Mullein (*Verbascum Thapsus*) is common in Minnesota and Iowa, although certainly not common in Mani-

toba west to the Rockies, common, however, west of the Rockies in British Columbia, Seattle, and other points in Manitoba. The *V. Blattaria* common eastward in Utah and the Pacific coast.

. The Foxglove (*Digitalis purpurea*) frequently cultivated as an ornamental plant on the coast, is a frequent escape and one finds patches of the escaped plants frequent in Oregon, Washington, and western British Columbia. The Toadflax (*Linaria vulgaris*) is common east and north. I might mention here, also, that the *Linaria Cymbalaria* of the same family, and common Pansy (*Viola tricolor*) of the *Violaceae*, is an escape from cultivation in Washington and Oregon. The Petunia, Dianthus, Phlox, objects of careful cultivation, are more or less weedy in Washington and Oregon.

A few weeds of the Goosefoot Family, *Chenopodiaceae*, are widely distributed in the northwest. The Russian Thistle (*Salsola Kali var. tenuifolia*) which at one time threatened to spread over the corn belt, as it was injurious in the wheat belt of the Dakotas and the Northwest, is abundant in some localities, along the right of way of railways and sandy soil in Minnesota, Wisconsin and Iowa, and common along railways and locally from Winnipeg west to the coast although not nearly as frequent as it is in Colorado, Utah and the drier regions of the west to the coast where it has found a congenial home. The common Lamb's quarter (*Chenopodium album*) is common across the continent from St. Paul to Seattle and from Omaha to Salt Lake and from Winnipeg to Vancouver. It follows the railways across the continent. The species was found in Banff, Sicamous Junction and Crow's Nest Pass, more abundant in southern Manitoba and in Minnesota than in Alberta and Saskatchewan. The Large Goosefoot (*Chenopodium hybridum*) common in Minnesota and Winnipeg and Winnipeg Beach and in many places of Minnesota, Wisconsin, Missouri and Illinois. The *Chenopodium glaucum* found rather common about the great lakes also occurs in Winnipeg and Winnipeg Beach, where it is common.

The Western Pigweed (*Monolepis Nuttalliana*) is common in Saskatchewan and Manitoba, it is of more frequent occurrence in fields than the common Goosefoot and more abundant than the Russian Thistle in that region. It has not reached Iowa although found in Minnesota and reported from Missouri by Robinson and Fernald. It occurs in all of the provinces from Winnepeg to British Columbia.

The species of weeds of the Pink Family, *Caryophyllaceae*, are not numerous. The Cowherb (*Saponaria Vaccaria*) occurs in the wheat growing section of the northwest frequent in Minnesota and Dakota,

abundant also in the wheat growing sections of the country north and south, though generally closely associated with wheat it is not always so. In the Great Basion of Utah it is frequently found in dry places on banks in the Cache Valley in Utah. The Corn Cockle (*Agrostemma Githago*) has a similar distribution. The Bouncing Betty abundant about St. Paul and Minneapolis, and northeastern Iowa and is widely scattered but never abundant in other sections of the state, in British Columbia, especially near Victoria, Vancouver, North Bend and in western Washington it is abundant. The Night-flowering Catchfly (*Silene noctiflora*) which has been a weed of gardens for thirty years in the state of Wisconsin, has become widely diffused in Illinois and Missouri and other clover growing states of the west because of the large importation of clover seed from Europe and the eastern states where the weed is common. It was not observed in Manitoba or elsewhere in western Canada. The Catchfly (*Silene dichotoma*) related to the Night-flowering Catchfly, has become common in clover fields from New England to Iowa and Texas. The Ragged Robin (*Lychnis Flos-cuculi*) and the White Catchfly (*L. alba*) occur under similar situations but less frequently. The *Cerastium vulgatum* is common in pastures in some parts of Iowa and on the Pacific coast, Victoria, Vancouver, and Seattle, Washington. The Nodding Chickweed (*Cerastium nutans*) is common in fields in Missouri, Illinois and southern Iowa. The common Chickweed (*Stellaria media*) on the other hand is a common garden and lawn weed from Minnesota, Emerson, Winnipeg, Winnipeg Beach, Manitoba, on the west slope as Sicamous, Vancouver, and Victoria and in the state of Washington, Seattle and Everett, and a common weed in the northern Mississippi Valley to the Atlantic coast and in the Rocky Mountains. It is now spreading rapidly in shaded lawns in many parts of Iowa.

The common Purslane or Pusley (*Portulaca oleracea*) has been more weedy in New England since the beginning of the eighteenth century. It has been a common weed in the Mississippi Valley since the early agricultural settlements. Now is common in gardens and cultivated fields. It is also common in the Rocky Mountains country and on the Pacific coast and the Gulf states.

The Pigweeds so common and weedy in the northern Mississippi Valley states are not abundant in the northwest. The common Pigweed (*Amarantus retroflexus*) was common in St. Vincent, Minnesota, Emerson, Manitoba, but was rare in Winnipeg, more common on the west slope of the Rockies, Kamloops, Victoria and Vancouver. The *Amarantus graecizans,* the common Tumbleweed of Iowa, is not common in Manitoba and

the other provinces east of the Rockies. It occurs in some of the irrigated fields near Kamloops.

Of the Dogbane Family (*Apocynaceae*) none of the species are especially weedy in Manitoba and westward, though the *Apocynum cannabinum* is a most troublesome weed in Iowa and Minnesota. It is also a weed in the Rocky Mountain states. Of the Milkweed Family (*Asclepiadaceae*), The common Milkweed (*Asclepias syriaca*) occurs occasionally in southern Manitoba and less so in the Saskatchewan, though it is one of the most common weeds in Iowa and Minnesota. Of the family *Urticaceae,* one weed is common from Kentucky north to Minnesota and Wisconsin and west to the Rockies and in the great basin country, namely the common Hemp (*Cannabis sativa*) which has largely spread from cultivated fields of the plant and its use as a bird seed. The Nettles, especially *Urtica gracilis* and *U. dioica* are common northward in Wisconsin and Minnesota, though not abundant in Iowa, found also in the Rocky Mountains in British Columbia and Manitoba. In the great basin, Salt Lake Valley, the western *U. holosericea* has taken its place.

Of the family *Umbelliferae,* I saw no introduced weeds, though doubtless *Pastinaca sativa* and *Daucus carota* occur in Manitoba, both occur in British Columbia and in Washington. Both of these are common roadside weeds in the northern Mississippi Valley and eastward. The Wild Carrot is abundant in clover fields in the east. It is disseminated with clover seed. The *Cicuta maculata* is common in Saskatchewan and Manitoba.

Of the *Malvaceae* one weed is fairly common in southern Manitoba, Common Cheeses (*Malva rotundifolia*). It is likewise common on the Pacific coast in Washington and British Columbia. A second species *M. crispa* is local in the Northern Mississippi Valley. The Evening Primrose (*Oenothera biennis*) of the Primrose Family *Onagraceae,* in its various forms is common on the Pacific coast, Washington and British Columbia and more or less common in Saskatchewan and parts of Manitoba. The Fireweed (*Epilobium angustifolium*) is common everywhere in the Rockies and easily takes the front rank as a weed in the forest clearing in British Columbia and Washington.

Comparatively few of the *Labiatae* are troublesome weeds in Canada; Self-heal (*Prunella vulgaris*) is common on the Pacific coast and in the wooded districts of eastern Manitoba, elsewhere it is not common and occurs from Missouri to Minnesota. Occasionally one sees *Teucrium canadense* in southern Manitoba common from Missouri to Minnesota and Nebraska. On the west slope of the Rockies to the Pacific coast a

Dead Nettle (*Lamium album*) is weedy. In Missouri and Illinois and eastward the *L. amplexicaule* is an early spring weed. The Hemp Nettle (*Galeopsis Tetrahit*) is common in British Columbia near Sicamous Junction.

There are but few weedy plants of the family *Leguminosae*. The Wild Licorice (*Glycyrrhiza lepidota*) is common everywhere on the prairies of Minnesota to Winnipeg west to the provinces of Saskatchewan and Alberta, but less frequent on the west slope, abundant in the Rockies to the great basin. The two species of Sweet Clover (*Melilotus alba* and *M. officinalis*) are common in parts of Minnesota and on the west coast. The former occurs near Winnipeg but is rare in the provinces to the west, east of the Rockies in Canada. Though both species are common in the Rockies south of the boundary, west to Utah, Idaho, and Washington. The Common Vetch (*Vicia sativa*) is common in the grain fields of northern Iowa, Wisconsin, and Minnesota, less frequent in the grain fields of Alberta.

The common Plantain (*Plantago major* and *P. Rugelii*) of the Plantain Family (*Plantaginaceae*) are common everywhere in the Northern Mississippi Valley, in Manitoba but less frequent westward. Common on the coast. It is likewise common in Washington. The Buckhorn (*Plantago lanceolata*) which has been widely distributed in recent years with clover seed in Iowa, occurs throughout the northern Mississippi Valley states and was observed in LaCrosse in 1897. It was not observed in the Northwest provinces, probably largely because clover is not a common crop and the seed is generally distributed with clover seed. It does, however, occur on the Pacific coast, Vancouver, British Columbia, Washington and Oregon. The Dooryard Knotweed (*Polygonum aviculare*) of the *Polygonaceae* is the most widely distributed of the genus, common throughout the northwest from Minnesota to the Rockies south to Colorado and west to Utah to the Pacific Northwest. It is common also in Manitoba from Winnipeg and Winnipeg Beach to the coast. The plants are much more robust than the plant of Iowa. The Wild Buckwheat (*P. Convolvulus*) commonly found in grain fields of the northern states is as yet not common in the Canadian provinces. The Smartweed (*P. Persicaria*) a roadside weed of the northern states is less frequent in the Canadian provinces although occurring as far north as Winnipeg Beach and Emerson and common everywhere from the great basin to the Atlantic coast. The Prince's Feather or Smartweed (*P. pennsylvanicum*) is a common plant in Iowa and Minnesota corn fields but it is a rare plant near the boundary.

There are few weeds of the Rose Family. The Silver Weed (*Potentilla anserina*) is common in Manitoba and provinces westward, especially in alkali impregnated soils. The Common Fivefinger (*P. monspeliensis*) is not common in the northwest provinces but common in the northern and eastern states. The Western Fivefinger (*P. dissecta*) is also common in the northwest especially westward.

Of the *Verbenaceae* there are no common weeds in Manitoba to the Pacific coast. Three species are troublesome in Iowa and Minnesota, the *Verbena stricta, V. hastata,* and *V. urticaefolia,* and the *V. bracteosa* is a common roadside weed in the Mississippi Valley and eastward.

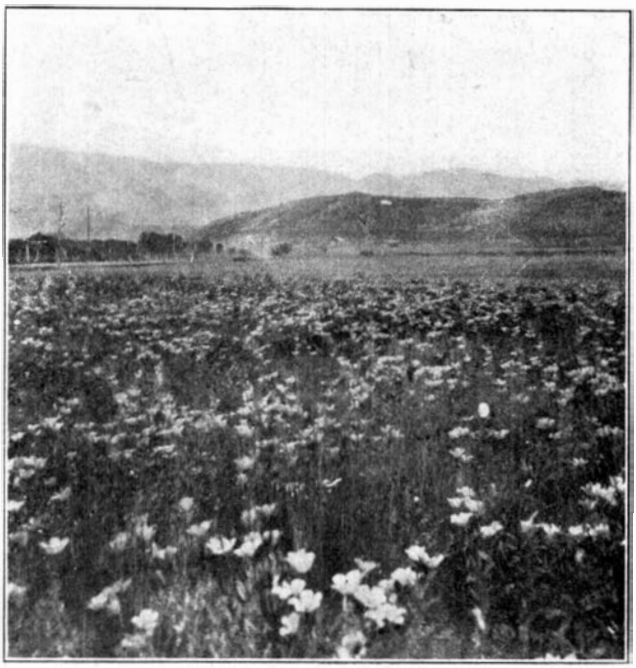
Weed migration is an interesting problem and the northwest is of parteular interest because a virgin soil is being turned under to produce agricultural crops. What weeds will succeed best in a country with the climate and rainfall of Canada should be followed up by the Canadian botanists.

Dr. C. H. Shaw[1] in an interesting communication on "The Causes of Timber-line on Mountains," shows how through human agencies in the Alps of Switzerland, the vegetation has become changed in a very marked degree. The whole aspect of our prairie flora in Iowa is changing and before many years that of the northwest will be very different from its character today.

[1]Plant World 12: Aug. 1909.

The Meadow Sunflower (*Helianthus grosse-serratus*) common in the lowlands of the Northern Mississippi Valley.

Yarrow (*Achillea Millefolium*) the common pasture weed of Northern United States and Canada, the Rockies to the Pacific.



A meadow of the Texas Lily (*Eustoma Russelliamum*) in a field, Colorado. Common from Texas to Nebraska and Colorado.